

REMARKS

The invention relates to a device and method for use of this device to manipulate substantially non-magnetic particles dispersed inside a magnetic fluid by employing a changeable pattern of local magnetic field maxima and minima.

Claims 1-17 are pending in the application. Claims 15-17 have been withdrawn from consideration as being drawn to a non-elected invention. Therefore claims 1-14 are currently under consideration.

Claim 1 has been amended to recite that one of said sources of magnetic fields comprises an array of magnetizable features on a micrometer or nanometer length scale. Support for this amendment is found at least in paragraph [0034] of U.S. Patent Application Publication No. 2007/0215553 and in original claim 9. Therefore, no new matter has been added by way of this amendment.

Claim 9 has been canceled without disclaimer or prejudice to the inclusion of the subject matter contained therein in any later filed continuation or divisional application(s) as set forth below.

Claims 10, 11 and 12 have been amended to correct antecedent bases in view of the cancellation of claim 9.

Claim 18 has been newly added and recites a device for manipulating non-magnetic particles dispersed inside a fluid wherein at least one of said sources of magnetic fields is positioned inside the fluid holding chamber. Support for this claim is found at least in paragraphs [0034] and [0035] of U.S. Patent Application Publication No. 2007/0215553. Therefore, no new matter has been added by way of the addition of this claim.

Rejection of claims 1-3, 6-9, and 13-14 pursuant to 35 U.S.C. §102(b)

The Examiner has rejected claims 1-3, 6-9, and 13-14 under 35 U.S.C. § 102(b) as being anticipated by US 6,231,760 B1 to Siddiqi. Specifically, the Examiner alleges that Siddiqi teaches a device comprising a fluid holding chamber, a fluid in contact the inner surface of the chamber containing a dispersion of magnetic and non-magnetic particles and at least two sources of magnetic fields positioned in close proximity to or inside of the chamber which produce a changeable pattern of magnetic field minima and maxima regions. Therefore, the Examiner

contends that Siddiqi anticipates the presently claimed invention. Applicants do not agree with the Examiner for the following reasons.

It is hornbook law that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” MPEP §2131 (quoting *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Id.* (quoting *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added)). Therefore, Siddiqi must describe each and every element of the claims in order to anticipate these claims under 35 U.S.C. §102(b). This reference does not satisfy this requirement.

The invention is based on the development of a device for manipulating non-magnetic particles dispersed inside a magnetic fluid by employing a changeable pattern of local magnetic field maxima and minima. The device can efficiently program the movement of fluids near surfaces simultaneously over large areas on a microscopic scale.

One aspect of the claimed device is that one of the sources of magnetic fields comprises magnetic features in a micrometer or nanometer scale dimension ranging in size from 0.1nm to 10,000nm, more preferably 10-1000 nanometers. An exemplary magnetic feature useful in the present invention is a magnetic bit pattern comprising a thin magnetic film. These magnetic features may comprise iron, iron-oxide, iron-platinum, cobalt, nickel, a rare-earth metal or another alloy forming ferromagnetic, or a ferrimagnetic or super paramagnetic material, or any combination thereof. The magnetic features can be identical, forming a uniform array on the inner surface of the fluid holding chamber or substrate. Alternatively, the magnetic features can be patterned heterogeneously on the surface. The magnetic features can be patterned directly on the top of the substrate surface or inner surface of the fluid holding chamber; they can be embedded inside the surface of the substrate of fluid holding chamber; or they can be held external to but in the near vicinity of the substrate surface or inner surface of the fluid holding chamber. Upon application of the magnetic fields, the magnetic particles apply a body force on the fluid and non-magnetic particles on the surface of the fluid holding chamber or substrate. Subsequently, the non-magnetic particles arrange into a selected geometric configuration on the surface of the substrate or the fluid holding chamber on a micro or nano scale.

In an earnest effort to advance prosecution of the claims, Applicants have amended the claims to be directed to a device that can efficiently program the movement of fluids near surfaces simultaneously over large areas on a microscopic scale. Specifically, claim 1 has been amended to recite that one of said sources of magnetic fields comprises an array of magnetizable features on a micrometer or nanometer length scale.

Siddiqi merely discloses an apparatus for mixing and separating magnetic particles for the purpose of isolating substances of interest from a nonmagnetic liquid test medium in laboratory-scale. The apparatus of Siddiqi comprises one or more magnets outside of the container. Siddiqi does not teach that one of the magnetic sources comprises a micro or nano scale magnetic feature. This feature in the present claim 1 directs the movement and assembly of the non-magnetic particles into a micro or nano scale geometric configuration.

In addition, Applicants have added new claim 18 which recites a device for manipulating non-magnetic particles comprising a fluid holding chamber, a fluid in contact the inner surface of the chamber containing a dispersion of magnetic and non-magnetic particles, and at least two sources of magnetic fields, wherein at least one of the sources of magnetic fields is positioned inside of the chamber. Siddiqi merely discloses an apparatus with all of the sources of magnetic fields positioned outside of the fluid holding chamber. Therefore Siddiqi does not teach each and every element of claim 18.

Applicants respectfully submit that claims 1-3, 6-9 and 13-14 and new claim 18 are not anticipated by Siddiqi for the reasons set forth above, and request reconsideration and withdrawal of the rejection pursuant to 35 U.S.C. §102(b).

Rejection of claims 1-2, 4-5, and 9-14 pursuant to 35 U.S.C. §102(b)

The Examiner has rejected claims 1-2, 4-5, and 9-14 under 35 U.S.C. § 102(b) as being anticipated by US 6,085,599 to Feller. Specifically, the Examiner alleges that Feller teaches a fluid holding chamber, a dispersion of magnetic particles and non-magnetic particles in contact with the inner surface of the fluid holding chamber, and at least two sources of magnetic fields positioned in close proximity to or inside of the chamber which produce a changeable pattern of magnetic field minima and maxima regions. Therefore, the Examiner contends that Feller anticipates the presently claimed invention. Applicants do not agree with the Examiner for the following reasons.

It is hornbook law that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” MPEP §2131 (quoting *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Id.* (quoting *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added)). Therefore, Feller must describe each and every element of the claims in order to anticipate these claims under 35 U.S.C. §102(b). This reference does not satisfy this requirement.

Feller discloses an apparatus for measuring flow rate of fluids flowing through or around a chamber. The apparatus of Feller comprises at least one electrically insulated flow passage, a fluid containing a dispersion of magnetic particles and a dispersion of non-magnetic particles, and at least a pair of magnets located outside of the flow passage. Feller does not teach that one of the magnetic sources comprises a micro or nano scale magnetic feature that directs the arrangement of non-magnetic particles into a micro or nano scale geometric configuration.

New claim 18 is similarly not anticipated by Feller. Feller discloses an apparatus where all of the sources of magnetic fields are positioned outside of the fluid holding chamber. Claim 18 recites a device with at least one of the sources of magnetic fields positioned inside of the chamber. Therefore Feller does not teach each and every element of claim 18.

Applicants respectfully submit that claims 1-2, 4-5 and 9-14 and new claim 18 are not anticipated by Feller for the reasons set forth above, and request reconsideration and withdrawal of the rejection pursuant to 35 U.S.C. §102(b).

Summary

Early consideration and allowance of the claims in the present application is requested at the earliest possible time.


Respectfully submitted,

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Date

March 11, 2011
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